

MAR-01-2005 TUE 08:46 AM AMD

FAX NO. 4087493718

P. 02



Patent
Attorney Docket No. H1105D

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of) **MAIL STOP AF**
)
Shibly S. Ahmed et al.) Group Art Unit: 2812
)
Application No.: 10/602,061) Examiner: R. Pompey
)
Filed: June 24, 2003)
)
For: DOUBLE GATE SEMICONDUCTOR)
HAVING SEPARATE GATES)

DECLARATION UNDER 37 C.F.R. § 1.131

U.S. Patent and Trademark Office
Customer Window, Mail Stop AF
Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

Sir:

I, Shibly S. Ahmed, an inventor of the subject matter claimed in the above-referenced application, hereby declare that:

1. An invention disclosure describing the invention was completed by me on August 16, 2002. The invention disclosure included five pages that describe the invention (See Exhibit A).

2. A letter dated August 29, 2002 was sent from Advanced Micro Devices, Inc. to the law firm of Harrity & Snyder, LLP indicating that the invention described in the invention disclosure had been approved for the preparation of a patent application (See Exhibit B).

3. A first draft of a patent application based on my invention disclosure was sent from Harrity & Snyder, LLP to me on October 1, 2002 via e-mail (See Exhibit C).

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P. 03

U.S. Patent Application No. 10/602,061
Attorney Docket No. H1105D

4. I provided comments regarding the draft patent application to Harrity & Snyder, LLP via email on October 15, 2002. The completed U.S. Patent Application, along with Declaration/Power of Attorney and Assignment documents were sent to Advanced Micro Devices, Inc. for execution on October 17, 2002 via Federal Express (See Exhibit D).

5. The executed Declaration/Power of Attorney and Assignment documents were sent to Harrity & Snyder LLP via Federal Express on November 7, 2002 for filing along with the application (See Exhibit E).

6. The Utility Patent Application was filed in the United States Patent and Trademark Office on November 8, 2002.

7. My co-inventors on this application (Haihong Wang and Bin Yu) are no longer employed at Advanced Micro Devices, Inc.

8. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and, further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements made jeopardize the validity of the application or any patent issuing therefrom.

Date: 3. 1. 05

Signature: Shibly Sadique Ahmed
Shibly S. Ahmed

MAR-01-2005 TUE 08:46 AM AMD

FAX NO. 4087493718

P. 04

U.S. Patent Application No. 10/602,061
Attorney Docket No. H1105D

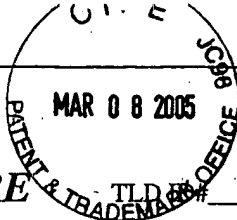
LIST OF EXHIBITS

- A. Copy of relevant portions of AMD Invention Disclosure prepared August 16, 2002.
- B. Copy of relevant portions of letter from AMD to Harrity & Snyder, LLP dated August 29, 2002 authorizing preparation of a patent application.
- C. Copy of email sent from Harrity & Snyder, LLP to inventor along with the draft application.
- D. Copy of letter from Harrity & Snyder, LLP to AMD dated October 17, 2002 enclosing application, Declaration/Power of Attorney and Assignment documents.
- E. Copy of letter from AMD to Harrity & Snyder, LLP dated November 7, 2002 enclosing executed Declaration/Power of Attorney and Assignment documents.

EXHIBIT A

34

Friday, August 16, 2002
TDG Patent Harvesting Session: Double Gate



AMD INVENTION DISCLOSURE

H1105

Rec'd date _____

This invention applies to: Project: ☐, Product: ☐, Process: ☐, Technology ☐, Other ☐,
IMPORTANT Please identify any potential use: _____

List 2 to 5 key search words related to the invention: _____

Working title of invention: Double-Gate FinFET with Separate gates
created by Chemical-Mechanical polishing (CMP)

→ INVENTOR/SESSION PARTICIPANT ADDRESS INFORMATION IS ON NEXT PAGE (1A) ←

Inventor's signature: Shibly Sadique Ahmed date: _____

Inventor's printed full name: SHIBLY S. AHMED Citizenship: _____

Employee #: _____ Extension: _____ Mail stop: _____ Home telephone: () _____

AMD email address: _____ AMD office FAX: () _____

Division: _____ Directorate: _____ Dept #: _____ Dept : _____ Manager: _____

Residence address: _____

Post Office address: _____

Co-Inventor's signature: Haihong Wang date: _____

Co-Inventor's printed full name: _____ Citizenship: _____

Employee #: _____ Extension: _____ Mail stop: _____ Home telephone: () _____

AMD email address: _____ AMD office FAX: () _____

Division: _____ Directorate: _____ Dept #: _____ Dept : _____ Manager: _____

Residence address: _____

Post Office address: _____

Co-Inventor's signature: Bin Yu date: _____

Co-Inventor's printed full name: _____ Citizenship: _____

Employee #: _____ Extension: _____ Mail stop: _____ Home telephone: () _____

AMD email address: _____ AMD office FAX: () _____

Division: _____ Directorate: _____ Dept #: _____ Dept : _____ Manager: _____

Residence address: _____

Post Office address: _____

Co-Inventor's signature : _____ date : _____

Co-Inventor's printed full name: _____ Citizenship: _____

Employee #: _____ Extension: _____ Mail stop: _____ Home telephone: () _____

AMD email address: _____ AMD office FAX: () _____

Division: _____ Directorate: _____ Dept #: _____ Dept : _____ Manager: _____

Residence address: _____

Post Office address: _____

State total number of inventors here: _____. If there are more than four inventors, insert duplicate page 1.

Friday, August 16, 2002

TDG Patent Harvesting Session: Double Gate

AMD INVENTION DISCLOSURE

TLD ID# _____

Rec'd date _____

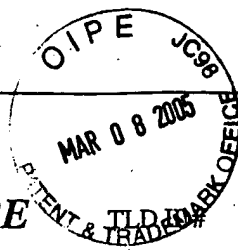
Identify known relevant art (patents, publications, other information): _____

State the problem solved by the invention: Create two separate gates for
double-gate structure, which provide more flexibility
in circuit design.

Brief description and sketch of the invention (*please attach copies of documents like AMD patent notebook pages, reports and drawings that are helpful in describing / understanding the invention*): _____

Please see sheets.

Friday, August 16, 2002
TDG Patent Harvesting Session: Double Gate



AMD INVENTION DISCLOSURE

Rec'd date _____

Advantages (check all that apply):

<input type="checkbox"/> simplifies manufacturing	<input type="checkbox"/> improves accuracy / precision	<input type="checkbox"/> reduces component parts
<input type="checkbox"/> reduces cost of manufacturing	<input type="checkbox"/> improves reliability	<input type="checkbox"/> improves signal to noise ratio
<input type="checkbox"/> improves density	<input type="checkbox"/> improves efficiency	<input type="checkbox"/> provides new functionality
<input type="checkbox"/> increases operating speed	<input type="checkbox"/> increases operating range	<input type="checkbox"/> other, explain below

Discussion of advantage(s) of the invention over other solutions

(emphasize *technical advance in the art* as measured against known art): _____

Please take special care to preserve documentary evidence of the original date of conception of the invention. AMD Inventors' notebooks with witness signatures are useful in this regard. Notebooks are issued on request to inventors by the local AMD site Technical Librarian.

Please attach copy of first written description(s) of invention, with dates, names of persons with whom the description was discussed.

Please attach copy of first drawing(s) of invention, with date(s).

Describe any external disclosure of invention, place, date, circumstances of disclosure, with copy of NDA.

Does plan exist to publish, disclose or sell? No ☐, Yes ☐, If yes, where and when? _____

Was invention jointly developed with participation of inventors from outside AMD: No ☐, Yes ☐,

If yes, Company name _____,

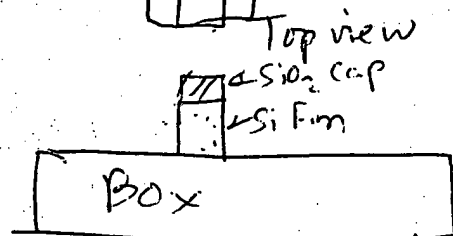
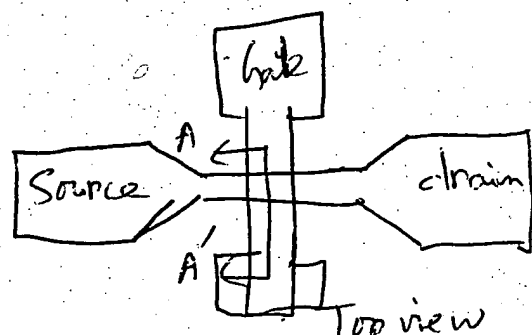
If yes, name of AMD business contact and development contract no. _____

Background

Background: The Double-gate (DG) MOSFET is considered the most scalable of all CMOS structures. In the past, process complexity posed a significant barrier to the fabrication of DG devices. The introduction of FinFET simplified the process flow and made it compatible with conventional CMOS process. However, in all the reported ~~result~~ works on FinFET, two gates are tied up connected together. In this disclosure, a new fabrication is proposed to achieve separate gates in FinFET. In case of separate gates, the different bias can be applied to the gates, which will give more flexibility to the circuit design.

Description of process flow:

- 1) First the active layer is defined.
- 2) Then the gate oxide is grown and gate material is deposited. (Fig. 2)
- 3) ~~Then Define the gates~~ by lithography and selectively
- 3) The gates are defined by lithography and the ~~select~~ gate materials are selectively etched.



Cross-sectional view AA'

Fig. 1

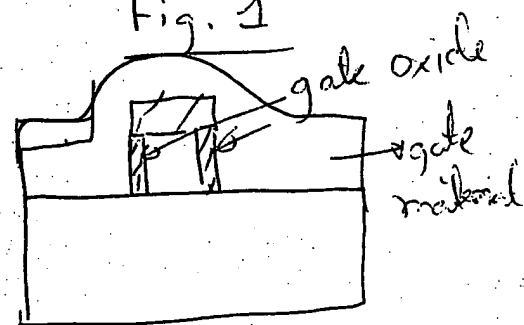


Fig. 2

4) Gate material is left on top of cap oxide layer. Then ~~CAP chemical~~ This excess gate material is polished from above the CAP oxide. Separate contacts can be ~~put~~ created for the gate [Fig. 3]

5) The gates can be biased ~~on~~ ~~different~~ separately to give provide more flexibility to circuit design.

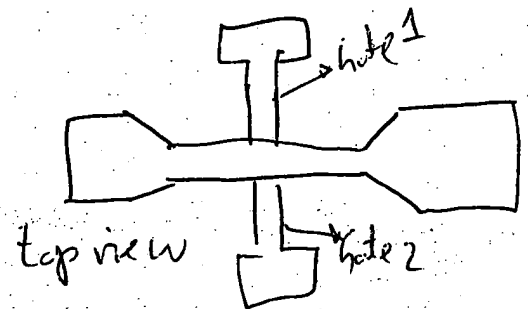
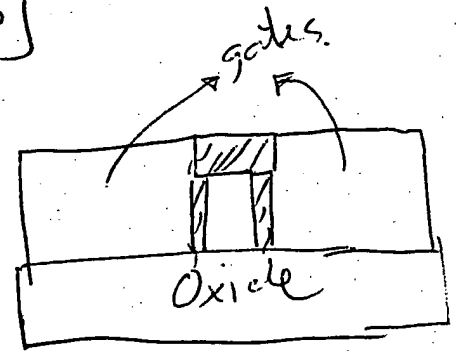
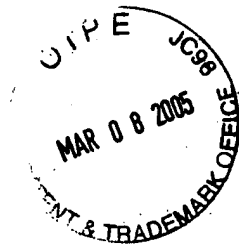


Fig. 3.

EXHIBIT B



One AMD Place
P.O. Box 3453
Sunnyvale, CA 94088-3453
Tel (408) 732-2400

August 29, 2002

Via Federal Express

Glenn Snyder, Esq.
Harrity & Snyder, L.L.P.
11240 Waples Mill Road
Suite 300
Fairfax, VA 22030

AUG 30 2002

Re: TDG Double Gate Patent Harvesting Session - August 16, 2002

Dear Glenn:

Attached are a spreadsheet and hard copies of invention disclosure forms (IDFs—2sets) from the TDG Double Gate patent harvesting session held August 16, 2002.

If you have any questions, please feel free to contact me at (408) 749-2114 or via email at winona.orange@amd.com.

Best regards,

Winona C. Orange
Paralegal
Technology Law Department
Phone: (408) 749-2114 (or 800/538-8450, x42114)
Fax: (408) 774-7483
Email: winona.orange@amd.com

Enclosures

EXHIBIT C

Alan Pedersen-Giles

From: Alan Pedersen-Giles [apgiles@harritysnyder.com]
Sent: Tuesday, October 01, 2002 10:41 AM
To: shibly.ahmed@amd.com
Subject: Draft patent application – AMD refs. H1105, , H1159, and H1169 -- Our ref. 0020-0068



Figs-0020-0068.pdf



Forwarding draft
application.p...



New appl.
0020-0068.doc

Dear Shibly,

Enclosed are a draft patent application, drawings, and an accompanying cover letter, the first in Word and the latter two in PDF format. Please review, and ask your fellow inventors to review, this application for accuracy and completeness. Please send me your comments, preferably before October 8, 2002.

If you have any questions or concerns, please do not hesitate to call or e-mail.

Best Regards,
Alan Pedersen-Giles

Harrity & Snyder, L.L.P.
11240 Waples Mill Road, Suite 300
Fairfax, Virginia 22030
571-432-0809 (Direct)
571-432-0808 (Facsimile)
apgiles@harritysnyder.com

EXHIBIT D

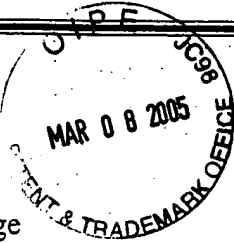
HARRITY & SNYDER, L.L.P.

AN INTELLECTUAL PROPERTY FIRM

11240 WAPLES MILL ROAD
SUITE 300
FAIRFAX, VA 22030
TELEPHONE: (571) 432-0800
FACSIMILE: (571) 432-0808

October 17, 2002

Ms. Winona Orange
Advanced Micro Devices, Inc.
One AMD Place
M/S 68
P.O. Box 3453
Sunnyvale, CA 94088-3453



VIA FEDERAL EXPRESS

Re: Final Draft Patent Application
Title: DOUBLE GATE SEMICONDUCTOR DEVICE HAVING
SEPARATE GATES
Inventors: Shibly S. AHMED et al.
AMD Ref. No.: H1105
Our Ref. No.: 0020-0068

Dear Winona:

Enclosed are Declaration/Power of Attorney and Assignment documents for the patent application referenced above, along with the application. Please have the inventors execute these documents and return them to us for filing in the U.S. Patent and Trademark Office. Also enclosed are Taiwanese Oath and Assignment forms.

We are not aware of any bar dates relating to this application.

We will send you a paper copy of the application and the other executed documents, along with a disk copy of the application in both U.S. and PCT formats, after we file the application in the U.S. Patent and Trademark Office.

Thank you for allowing us to assist you in this matter.

Sincerely,

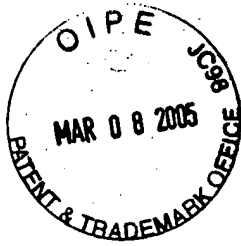
A handwritten signature in dark ink, appearing to read "Alan Pedersen-Giles".

Alan Pedersen-Giles

APG:ac
Enclosures

EXHIBIT E

Via Federal Express



One AMD Place
P.O. Box 3453
Sunnyvale, CA 94088-3453
Tel (408) 732-2400

November 7, 2002

Alan Pedersen-Giles, Esq.
Harrity & Snyder, L.L.P.
11240 Waples Mill Road
Suite 300
Fairfax, VA 22030

RE:

Our Reference:	H1105
PRIORITY CODE:	A
Your Reference:	0020-0068
Title:	"DOUBLE GATE SEMICONDUCTOR DEVICE HAVING SEPARATE GATES"
Inventor(s):	Shibly S. Ahmed, Haihong Wang and Bin Yu

Dear Mr. Pedersen-Giles:

Enclosed please find the executed formal paperwork for the above-referenced case, together with the drafted application and drawings.

The executed Taiwanese Oath and Assignment form will be kept in the respective file here at AMD.

Please contact Dick Roddy for instructions on when to file this case.

If you need further assistance, please contact Winona Orange, the paralegal handling this AMD case.

Sincerely,

Terri Bicknell
Senior Administrative Assistant
Technology Law Department

/tb

Enclosure(s)